

REMARKS

This Response is submitted in response to the final Office Action dated September 7, 2006. Claims 1-12 are currently pending in this application. Claims 13-32 have been withdrawn. Claim 1 is independent.

Rejection Under 35 U.S.C. § 103(a)

Claims 1-12 are rejected as being unpatentable over Murali, U.S. Patent No. 6,788,836 ("Murali") in view of Yoshimura et al. U.S. Patent No. 5,835,646 ("Yoshimura").

The present invention provides structures, and methods of manufacturing structures, for providing optical connections between spaced-apart, opposing surfaces of substrates having optically active areas. In particular, an optical polymer layer is provided between opposing surfaces of a substrate and a component, or between two substrates, to allow optical signals to pass therebetween and to bond the opposing surfaces. In addition, a polymer layer is positioned between the first and second substrates, and a waveguide is disposed within the polymer layer between the first and second optically active areas on the first and second surfaces.

Independent claim 1 recites:

"An apparatus for transmitting light comprising:

a first substrate having a first surface including at least one first optically active area;

a second substrate having a second surface positioned in opposing spaced apart relationship from said first surface, where said second surface has at least one second optically active area opposing said at least one first optically active area;

*a polymer layer disposed between said first and second substrates; and  
a waveguide disposed within said polymer layer between said first and second optically active areas on said first and second surfaces, where said waveguide comprises a polymer core and a cladding for transmitting light therebetween."* (emphasis added)

Murali is directed to an multi-level waveguide to transmit light through a series of substrates, wherein the multi-level waveguide is comprised of stacked substrates containing a two dimensional array of transparent material filled vias to provide a pathway for light. As

illustrated in FIG. 11 of Murali, the first substrate 2 and second substrate 100 are not disposed in a spaced apart relationship. Additionally, Murali does not teach a polymer layer disposed between the first and second substrates, as required by independent claim 1, and Murali's waveguide 3 is not disposed within a polymer layer between first and second optically active areas. The Office Action admits that Murali does not expressly disclose: (1) a polymer layer disposed between first and second substrates; (2) a waveguide disposed within the polymer layer; (3) a first polymer comprising a photosensitive fluorinated polymer; and (4) a second polymer comprising cladding. The Office Action attempts to cure the deficiencies of Murali by applying Yoshimura.

Yoshimura discloses an active optical circuit board wherein an electro optical switch or optical modulator is driven with a voltage from an electronic device. The electrical signal is converted to an optical signal, is transmitted, and is then converted to an electrical signal at an optical receiver element. An electrical connection is formed between an optical wiring board and the electronic device for transmission of signals to another or the same electronic device. The Office Action sets forth that Yoshimura discloses a coupling between waveguide arrays comprising a polymer core and a cladding for transmitting light therebetween, wherein the cladding comprises a second polymer, and wherein the first polymer is a photosensitive fluorinated polymer. In addition, the Office Action states that "Yoshimura further discloses an additional structure (filter) embedded within the polymeric material. See column 4, lines 21-32, column 9, lines 26-29, column 14, lines 43-47 and Figures 24a-c for example." Applicant has carefully reviewed these sections of Yoshimura, and cannot find a teaching for a waveguide disposed within a polymer layer that is disposed between first and second substrates, as required by independent claim 1.

Specifically, column 4, lines 21-32 of Yoshimura discloses optical wiring characterized in that radiated light from a device (such as a filter) is directed incident to a photorefractive index material either connected to or spaced from the device to form a refractive index distribution, while producing a self-focusing effect. This section clearly does not disclose a waveguide disposed within a polymer layer that is disposed between first and second substrates. The next section of Yoshimura identified in the Office Action (column 9, lines 26-29) teaches a passive waveguide made of fluorinated polyamide or glass, and that polymer

materials are particularly preferred when flexibility is a requirement. This section also fails to teach a waveguide disposed within a polymer layer that is disposed between first and second substrates. The other section of Yoshimura identified in the Office Action (column 14, lines 43-47) discloses a waveguide that may be formed by positioning a photorefractive index material between fibers (or waveguides) at both ends of a band pass filter. This section also fails to teach a waveguide disposed within a polymer layer disposed between first and second substrates, as recited in independent claim 1. For at least these reasons, Yoshimura fails to cure the deficiencies of Murali.

In view of the above, it is respectfully submitted that Murali in view of Yoshimura fails to render obvious independent claim 1 of Applicant's invention. Claims 2-12 are not obvious over Murali in view of Yoshimura by virtue of their dependence from claim 1.

### Conclusion

Based on the foregoing, favorable reconsideration and allowance of claims 1-12 is solicited. If necessary, the Commissioner is hereby authorized in this and concurrent replies to charge payment (or credit any overpayment) to Deposit Account No. 19-1853 for any additional required fees.

Respectfully submitted,

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